Dr. Malik Shehr Yar – Community Medicine Revision Notes

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Epidemiology & Biostatistics

1. Epidemiology is the study of distribution and determinants of disease in populations.
2. Incidence measures new cases, prevalence measures total cases.
3. Point prevalence = existing cases at a specific time ÷ population.
4. Period prevalence includes cases over a duration.
5. Incidence rate reflects risk of developing disease.
6. Case fatality rate indicates severity of disease.
7. Attack rate is used in outbreak investigations.
8. Secondary attack rate excludes primary cases.
9. Sensitivity = ability to detect disease (true positive rate).
10. Specificity = ability to exclude disease (true negative rate).
11. High sensitivity test → good for screening.
12. High specificity test → good for confirmation.
13. PPV increases with higher disease prevalence.
14. NPV increases with lower disease prevalence.
15. Confounding variable is associated with both exposure & outcome.
16. Bias is a systematic error affecting validity.
17. Random error affects precision, not validity.
18. Cohort study measures incidence directly.
19. Case-control study measures odds ratio.
20. Relative risk >1 indicates risk factor.
21. Relative risk <1 indicates protective factor.
22. Odds ratio approximates RR in rare diseases.

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23. Cross-sectional study measures prevalence.

24. Experimental studies include RCTs.

25. Double blinding reduces observer bias.

Screening & Statistics

26. Screening is for early detection in asymptomatic individuals.

27. Lead time bias falsely increases survival.

28. Length bias favors slow-growing diseases.

29. Overdiagnosis bias detects non-progressive disease.

30. Normal distribution is bell-shaped.

31. Mean = average; Median = middle value; Mode = most frequent.

32. Median is least affected by extreme values.

33. Standard deviation measures dispersion.

34. p-value <0.05 is statistically significant.

35. Type I error = false positive.

36. Type II error = false negative.

37. Power = 1 – β (Type II error).

38. Confidence interval indicates precision of estimate.

39. Narrow CI = more precise estimate.

40. Correlation does not imply causation.

Infectious Diseases

41. Iceberg phenomenon: clinical cases are tip of disease burden.

42. Herd immunity protects non-immune individuals.

43. R_o >1 indicates disease spread.

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44. Incubation period = exposure to symptom onset.

45. Latent period = exposure to infectiousness.

46. Infectious period = time of transmission.

47. Carrier state: asymptomatic but infectious.

48. Vector-borne diseases include malaria, dengue.

49. Reservoir may be human, animal, or environment.

50. Zoonosis = disease transmitted from animals to humans.

Immunization

51. Active immunity is long-lasting.

52. Passive immunity is immediate but temporary.

53. Live vaccines give strong immunity (e.g., measles).

54. Killed vaccines require boosters.

55. BCG is given intradermally.

56. OPV is oral live vaccine.

57. Measles vaccine at 9 months (in many programs).

58. DPT is given intramuscularly.

59. Cold chain maintains vaccine potency.

60. Vaccine vial monitor indicates heat exposure.

61. Adjuvants enhance immune response.

62. Booster dose increases immunity.

63. Contraindication: severe allergic reaction to prior dose.

64. Pulse Polio targets eradication.

65. Eradicated disease: Smallpox

Public Health & National Programs

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66. Primary prevention prevents disease occurrence.

67. Secondary prevention = early diagnosis.

68. Tertiary prevention reduces complications.

69. Levels of prevention: primordial, primary, secondary, tertiary.

70. IMR = infant deaths (<1 year age) per 1000 live births in a specific year

71. MMR = maternal deaths per 100,000 live births.

72. Under-5 mortality is key health indicator.

73. Demographic transition has 5 stages.

74. Replacement fertility ≈ 2.1.

75. Census conducted every 10 years; last one in Pakistan in 2023.

76. Population of Pakistan is 241.5 million (2023 census)

77. SDGs replaced MDGs in 2015.

78. Universal Health Coverage ensures access to care.

79. Health indicators include morbidity & mortality rates.

80. DALY = years of life lost + years lived with disability.

Nutrition

81. Protein-energy malnutrition includes marasmus & kwashiorkor.

82. Marasmus = severe wasting without edema.

83. Kwashiorkor = edema + fatty liver.

84. Vitamin A deficiency → night blindness.

85. Vitamin D deficiency → rickets/osteomalacia.

86. Vitamin C deficiency → scurvy.

87. Iron deficiency → microcytic anemia.

88. Iodine deficiency → goiter.

89. Balanced diet includes all nutrients.

90. BMI = weight/height².

91. BMI ≥25 = overweight.

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92. Exclusive breastfeeding for 6 months.

93. Colostrum is rich in antibodies.

94. ORS treats dehydration.

95. Zinc reduces diarrhea duration.

Environmental Health

96. Safe water is essential for health.

97. Chlorination is common water purification method.

98. Residual chlorine ensures safety.

99. Hard water contains calcium & magnesium.

100. Air pollution causes respiratory diseases.

101. Noise pollution → hearing loss.

102. Waste disposal methods: landfill, incineration.

103. Biomedical waste requires segregation.

104. Vector control reduces disease transmission.

105. Sanitation prevents fecal-oral diseases.

MCH (Maternal & Child Health)

106. Antenatal care minimum 4 visits (WHO recommends more now).

107. Iron-folic acid prevents anemia.

108. Tetanus toxoid protects mother & baby.

109. Institutional delivery reduces mortality.

110. Breastfeeding within 1 hour of birth.

111. Low birth weight <2.5 kg.

112. Neonatal period = first 28 days.

113. Perinatal period includes late fetal + early neonatal.

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114. IMNCI focuses on child survival.

115. Growth monitoring uses growth charts.

Genetics & Screening

116. Screening test should be simple & acceptable.

117. Wilson & Jungner criteria guide screening programs.

118. Mass screening = whole population.

119. Selective screening = high-risk groups.

120. Genetic counseling helps prevent inherited disorders.

Health System & Management

121. Primary health care = first contact care.

122. Alma-Ata declaration (1978) emphasized PHC.

123. Health team includes doctors, nurses, workers.

124. ASHA worker connects community to health system.

125. Referral system ensures proper care levels.

126. Health education promotes behavior change.

127. IEC = Information, Education, Communication.

128. BCC = Behavior Change Communication.

129. Logistics ensures supply chain efficiency.

130. Surveillance monitors disease trends.

Miscellaneous High-Yield

131. Epidemiological triad = agent, host, environment.

132. Web of causation explains multifactorial diseases.

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133. Iceberg phenomenon common in TB, polio.

134. Disability limitation is tertiary prevention.

135. Rehabilitation restores function.

136. Quarantine restricts exposed individuals.

137. Isolation separates infected individuals.

138. Notifiable diseases must be reported.

139. Outbreak = sudden increase in cases.

140. Endemic = constant presence of disease.

141. Epidemic = excess occurrence in area.

142. Pandemic = global spread.

143. Nosocomial infection = hospital-acquired.

144. Iatrogenic disease = caused by treatment.

145. Standard precautions prevent infection.

146. Hand hygiene is most effective measure.

147. PPE reduces transmission risk.

148. Health economics studies resource allocation.

149. Cost-effectiveness compares interventions.

150. Prevention is more cost-effective than cure.

Mean: Sum of Values / Total Number of Values

Mean of 3,4,5,6,2 is 20/5 = 4

Median: Middle value among the series of numbers when numbers are arranged in ascending order

For example: 3,4,7,6,5 ; first arrange in ascending order > 3,4,5,6,7 > So the MEDIAN is 5.

If the series consists of even numbers then take average of middle 2 numbers.

Mode: Most common value in the series

Example: 13,14,13,13,13,13,16,17,19,19 > Here is MODE is 13.

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If no value is repeated, then no MODE.

Measure of Central Tendency: Mean, Mode, Median

Measure of Dispersion: Range, Median Deviation, Standard Deviation

Range: Difference between highest and lowest value > for example if values are 12, 14, 24 then Range is 24-12= 12

Validity: Ability of a test to correctly separate or distinguish all those who have a disease from those who do not have a disease.

Sensitivity: Ability of a test to identify all those having a disease (True Positive)

Specificity: Ability of Test to identify all those who do not have the disease (True Negative)

Contraception:

Temporary> Hormonal (pills), IUCD, Barrier, Natural

Permanent > Bilateral Tubal Ligation, Vasectomy

OCPs is the most commonly used contraception method

Mech of Action: Disrupt Hypothalamic-Pituitary Ovarian Axis

Success Rate: 99.5 – 99.9 %

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